
Energy $mart Schools
at the
West Hawaii
Explorations Academy

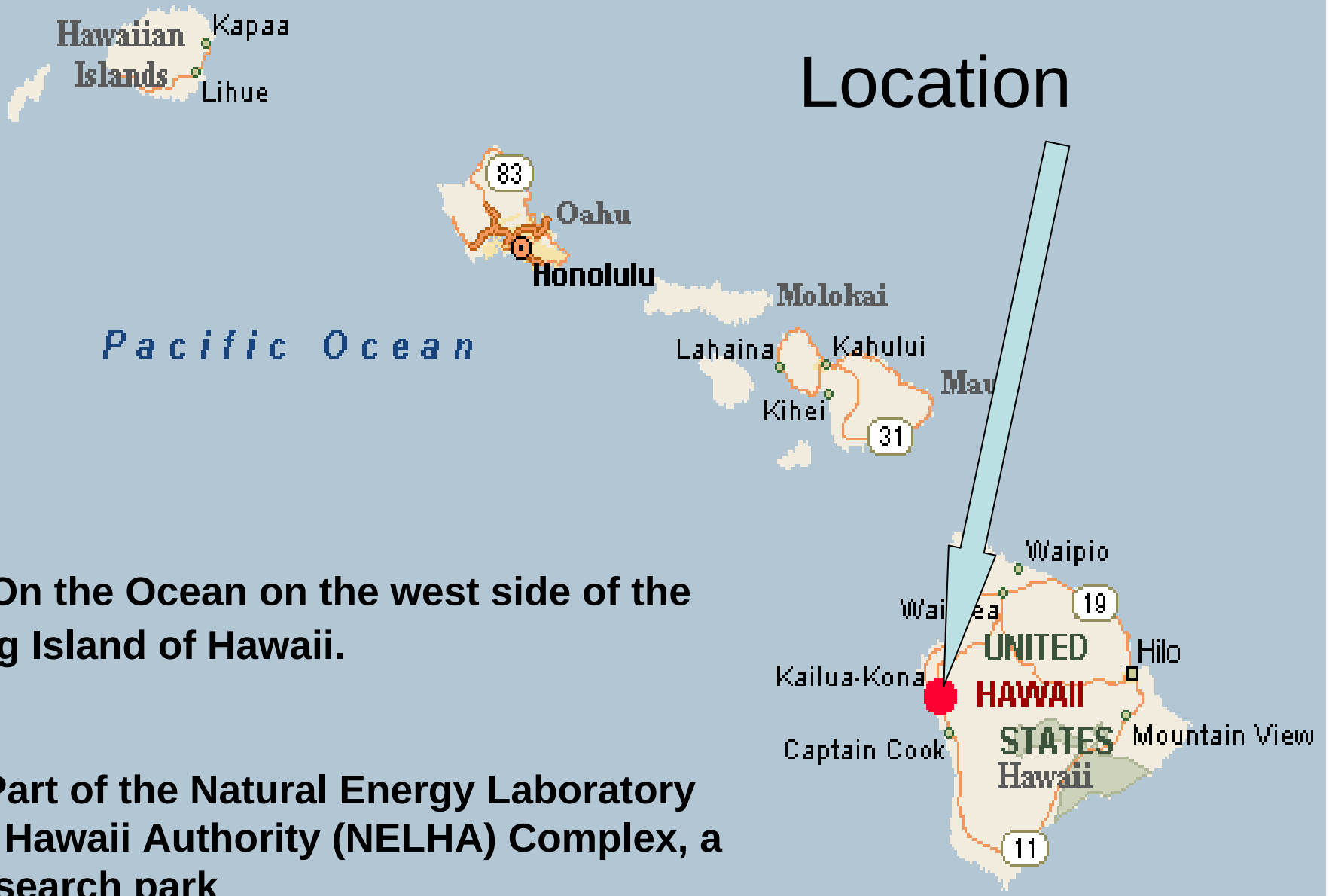
Our School

- A public charter high school
- 120 students-8th thru 12th grade
- Project driven curriculum

Our School - Cont.

- Main Emphasis :
  - Ocean Science
  - Plant Life Studies
  - Alternative Energy

Location



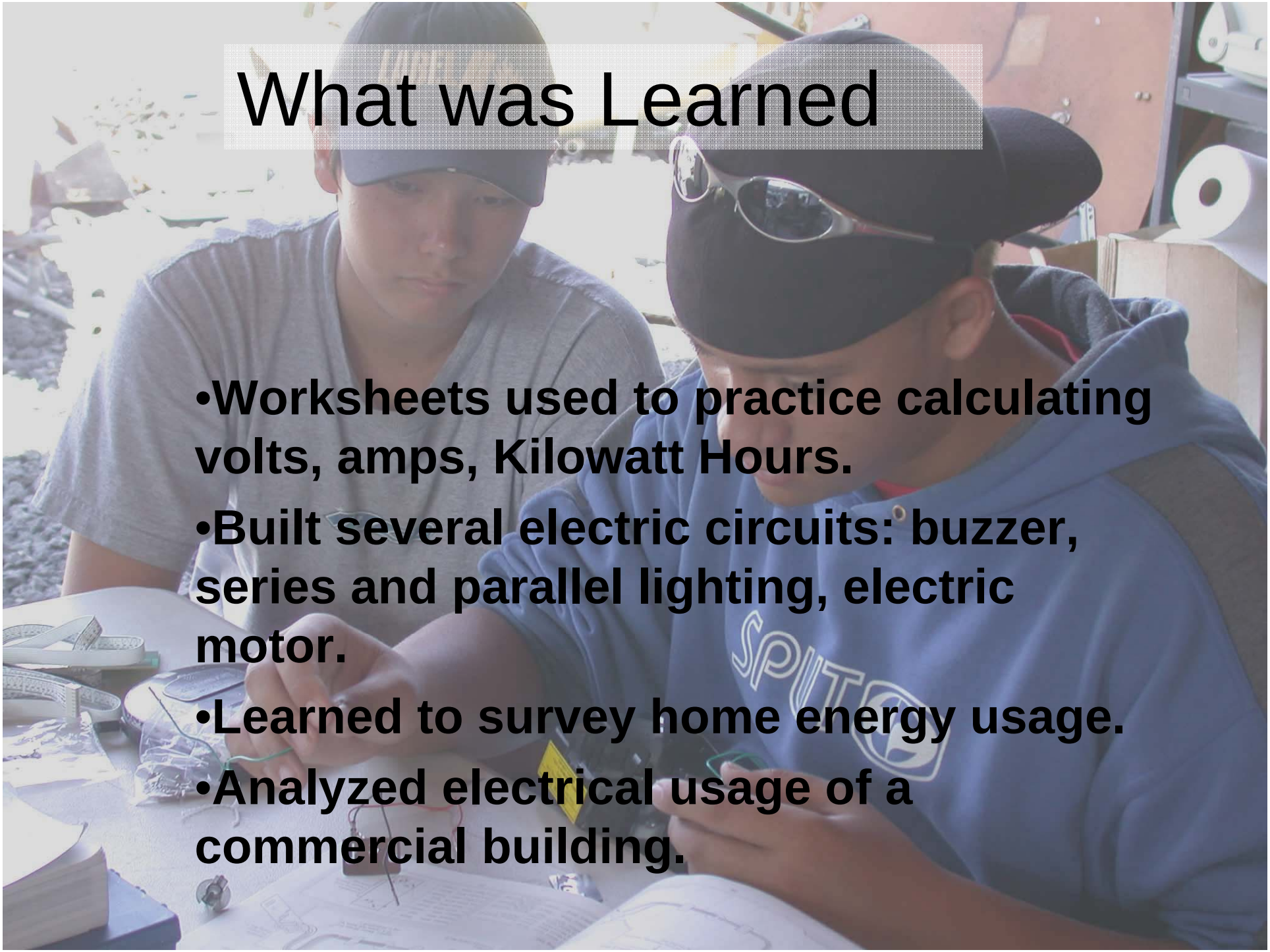
- **On the Ocean on the west side of the Big Island of Hawaii.**

- **Part of the Natural Energy Laboratory of Hawaii Authority (NELHA) Complex, a research park**

Naturally Occurring Features

- Most sunshine of any coastal location in the U.S.
  - Ideal location for photo-voltaic system.
- Availability of Warm and Cold seawater
  - Unique air conditioning system
- School is mostly outdoors due to average annual high temperature variation of only 5 degrees F

What was Learned



- **Worksheets used to practice calculating volts, amps, Kilowatt Hours.**
- **Built several electric circuits: buzzer, series and parallel lighting, electric motor.**
- **Learned to survey home energy usage.**
- **Analyzed electrical usage of a commercial building.**

Electrical Savings Achieved

- New refrigerator
  - –2200 kwh > 500 kwh annually
  - –2 year payout
- Computer turn off program
  - –Non School Hours saves 30% of annual electric usage
- Low pressure compressor

  -Replaced with more efficient motor.

  Saves 6% per year.

Dissemination Activity

- Tours
  - –3000 grade school students visit on field trips
- Guests of NELHA
- Parents
- Adult visitors from schools and businesses

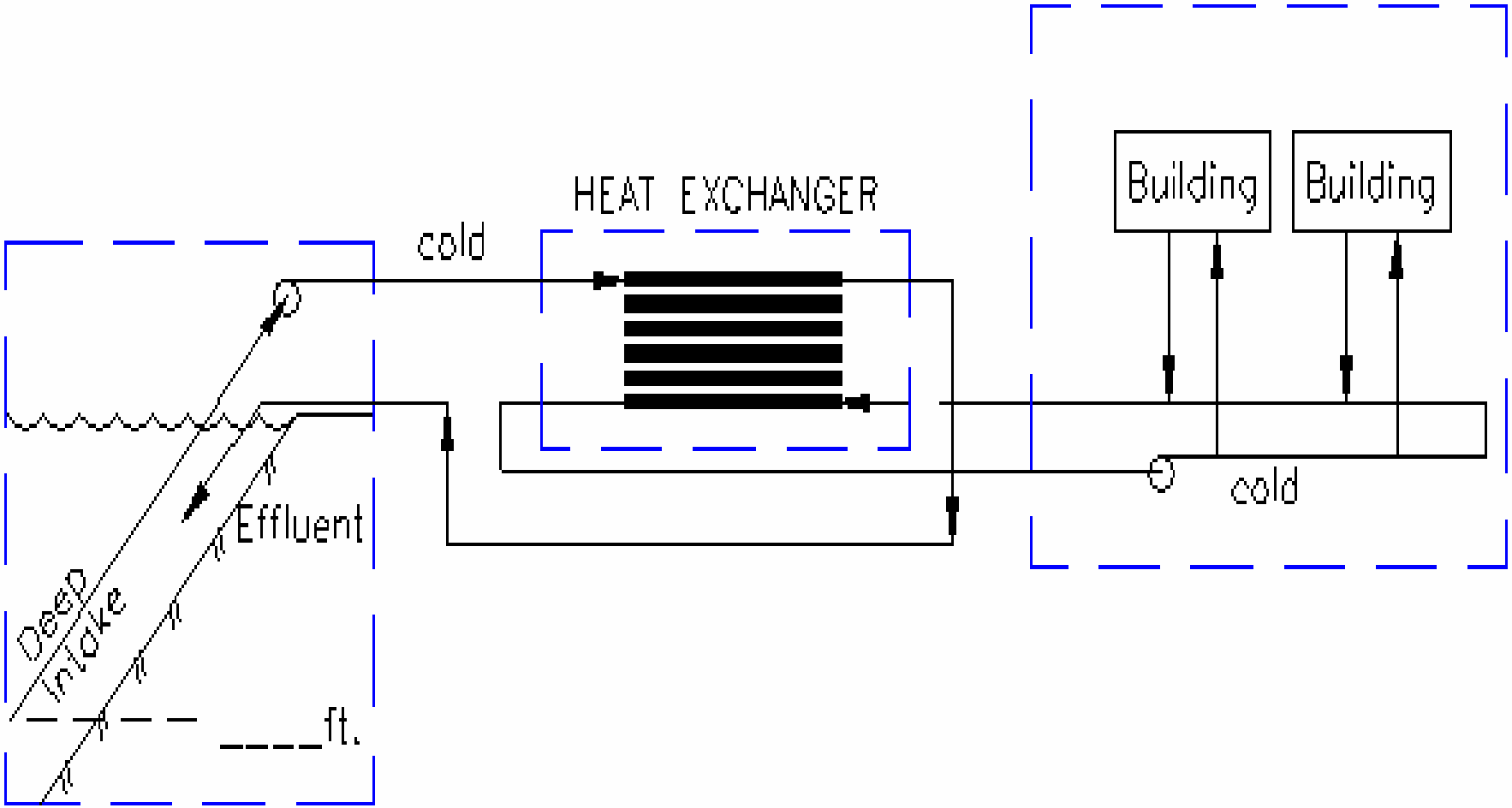
Dissemination Activity – Cont.

Unique Approach to Air Conditioning

- Seawater available at 45 degrees F. from offshore depth of 2000 feet.

Section of Cold Seawater Supply Line

Cold Seawater Air-Conditioning



Unique Approach to Air Conditioning - Cont.

- Air conditioned 10,000 square foot NELHA building
- Saves $4,000 per month
- Research done for use at new school location

Deep Seawater Cooled Drinking Fountain

Photo Voltaic System at WHEA

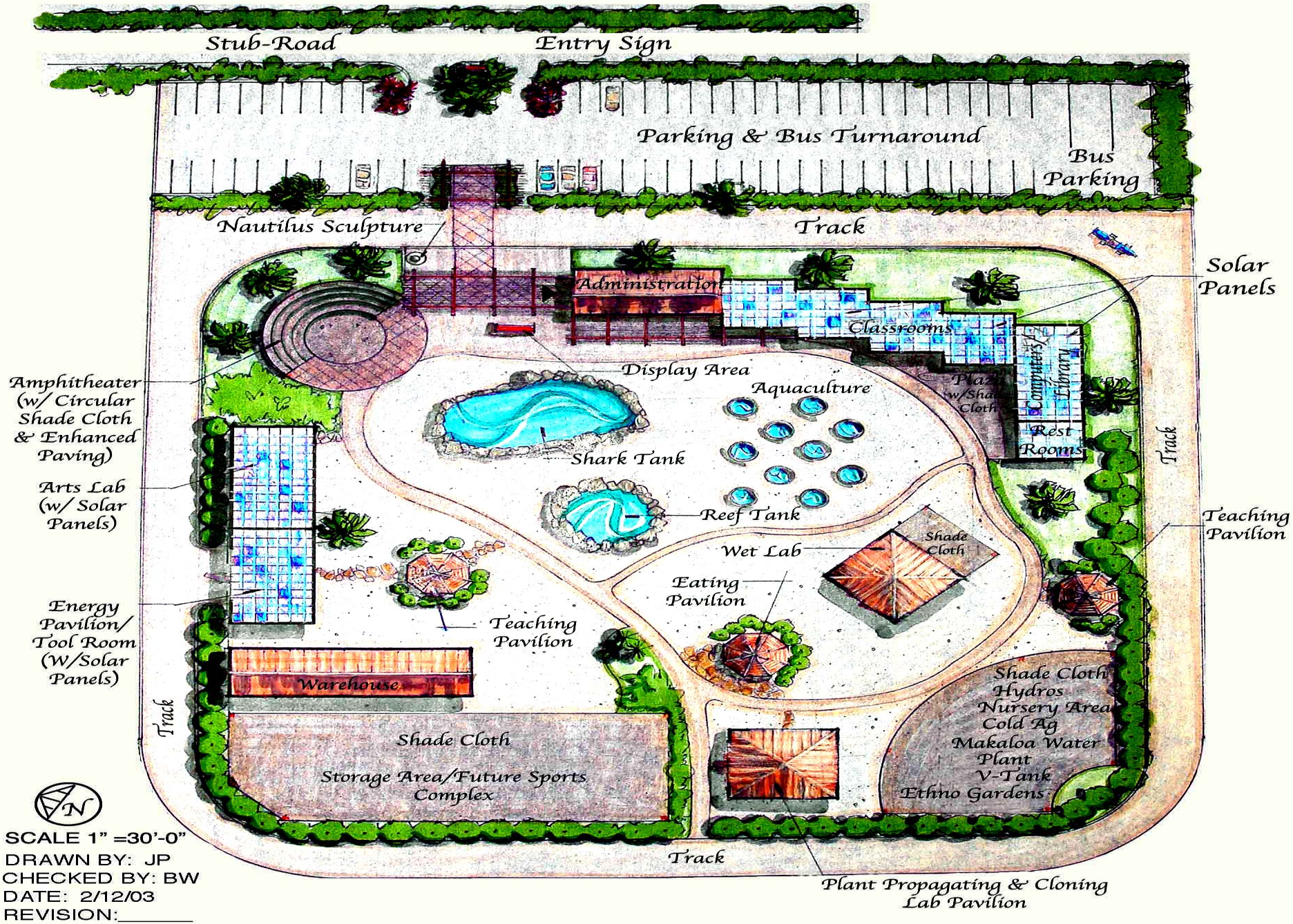
- 10 KW system
- Avg. output = 50 KWH per day AC
- Supplies 110 percent of school needs at peak hours
- Ideal use of PV: School's needs tend to rise and fall with the sun.
- Excess generated "sold" back to utility

Photo Voltaic System at WHEA

Future Plans

- School to be Re-built at New Site

WHEA
PRELIMINARY SITE PLAN



SCALE 1" =30'-0"
DRAWN BY: JP
CHECKED BY: BW
DATE: 2/12/03
REVISION:_____

Future Plans – Cont.

- Energy Efficient Equipment
- PV system is portable
- Plans include Daylighting of buildings


Daylighting
Test Thursday

Future Plans – Cont.

- Seawater Air Conditioning
- Alternative Energy Studies Continuing